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connective tissue." "The liver cells also change sugar into a kind of starch. This is soon oxidized in the liver, and heat is produced for the use of the body." And so on *ad nauseam*.

Animal Hypnotism.[1] — The first part of Professor Verworn's *Contributions to the Physiology of the Central Nervous System* is taken up with an interesting account of the so-called hypnotism of animals. As early as 1636 Schwenter described the well-known experiment in which a hen is held on a horizontal surface, and a chalk-line drawn from her head over the surface; on releasing her, instead of recovering her normal position, she may remain motionless for some considerable time. Ten years later Kircher described the same experiment, except that he directed that the hen should be bound with a cord and part of the cord stretched in place of the chalk-line. On drawing the chalk-line the cord could be removed, leaving the hen motionless. In 1872 Czermak showed that the cord and chalk-line were superfluous, and that the experiment succeeded perfectly well without them. He likewise called attention to similar phenomena in the crayfish. The next year Preyer published experiments of a like nature on the guinea pig and frog. These were followed by contributions from Heubel and from Danilewsky, both of whom worked chiefly with the frog. As a result of these studies it was found that many animals, chiefly vertebrates, when placed in abnormal positions and held there till their struggles to recover had ceased, would remain motionless in some cases for an hour or more, especially when they were protected against strong sensory stimuli.

Schwenter believed the animals remained still from fright, and this idea was elaborated by Preyer. Kircher thought that the hen, knowing she was bound, believed it useless to resist, and therefore lay still. After the removal of the cord she mistook the chalk-line for the cord, and, believing she was still bound, made no effort at recovery. Czermak, and later Danilewsky, regarded the condition as directly comparable with the hypnotic state of the human subject. Heubel sought for an explanation of the phenomenon in conditions parallel with sleep.

In dealing with this subject Verworn considers three questions: first, what is the pose of the body and the condition of the musculature when the animal is "hypnotized"? secondly, to what extent is it open to sensory stimulation? and, thirdly, what part of the central nervous system is essential to this state? Answers to these questions are obtained from observations on guinea pigs, hens, frogs, and asps.

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[1] Verworn, Max. *Beiträge zur Physiologie des Centralnervensystems.* Erster Theil. Die sogenannte Hypnose der Thiere. Jena, G. Fischer, 1898. iv + 92 pp., and 18 illustrations in the text.

The postures which the "hypnotized" animals assume represent usually some step in the process of recovering from their abnormal positions, and they are held in these positions by a tonic contraction of their muscles. They are, so to speak, like so many instantaneous photographs of animals, in process of righting themselves. Verworn believes that the reason they remain motionless in this condition is not because their motor impulses have been inhibited, but simply because there are no such impulses.

In the "hypnotic" condition the animals' senses are normally acute, but their reflex capabilities are probably actually reduced, though the loss of this power may in part be due to exhaustion.

Heubel found that the experiments made on the frog could be performed as well on an animal without its cerebral hemispheres as on one in normal condition. This important observation has been confirmed by Danilewsky and by Verworn, and the latter has demonstrated the same to be true for the hen. In the hen, however, the presence or absence of the cerebrum makes a difference. While in both cases the animals may be brought into a motionless condition, a hen without a cerebrum will remain motionless an hour or more, instead of ten minutes, as in the normal animal. Moreover, her recovery is always associated with some obvious sensory stimulation, which is not necessarily so in the case of the normal hen. Guinea pigs whose spinal cords have been cut respond to the assumed hypnotic influence only by the anterior portions of their bodies. From these experiments Verworn concludes that the center for readjusting the position of the body, as well as that for the tonic contraction of the muscles, cannot lie in either cerebrum or cord, but must be somewhere between these parts. He assumes with reason that it is located in the cerebellum. It is remarkable, however, that Verworn has not attempted to test this assumption by trying experiments on animals from which the cerebellum had been removed.

According to Verworn the motionless condition of the animals is dependent upon two factors — a tonic stimulation of the cerebellar reflex center, whereby the animal is held in an attitude of recovery, and an inhibition of the motor areas of the cerebrum. As the cerebrum acts only in this negative way, an animal without its cerebrum may be made motionless by the positive action of its cerebellar center. In recovery the animal without its cerebrum is dependent upon its sense organs to generate impulses which may eventually affect its cerebellum, while the normal animal may have its cerebellum influenced not only through its sense organs, but also from its centers for spontaneous movements in the cerebrum. Thus animals with a cerebrum usually recover sooner than those deprived of this organ. The motionless condition in animals has then only a superficial resemblance to certain phases of hypnotism as seen in the human subject, and probably is an essentially different phenomenon.

G. H. P.

ZOÖLOGY.

Generic Names Preoccupied.— Dr. Carlos Berg has done a useful work in a critical study of recently proposed generic names with a view to the elimination of those preoccupied. In *Communicaciones del Museo Nacional de Buenos Aires*, 1898, pp. 41, 43 (December 17), he proposes to substitute the following names of animals for others preoccupied. Hoferellus for Hoferia; Iheringiana for Iheringiella; Halochnaura for Asterope; Gestroana for Gestroa; Corynophora for Halterophora; Meyrickella for Prionophora; Walsinghamiella for Gilbertia (Lepidoptera); Watsoniella for Watsonia; Schochidia for Lophostoma; Braunsianus for Anelpistus; Gilbertidia for Gilbertina; Matæocephalus for Cœlocephalus. The last two are genera of American fishes.

D. S. J.

Deep-Sea Fishes of Iceland.— Dr. Christian Lütken has just published, in English, a most valuable account of the fishes dredged by the "Ingolf" in 1895 and 1896 off Iceland and the Faroë. Forty-four species are recorded, three of them new, *Raja ingolfiana*, *Cyclothone megalops*, and *Macrurus ingolfi*. Important notes are given on the structure of different species. The lithographic plates of Cordts (some of them colored) which illustrate this paper are most excellent.

D. S. J.

Spolia Atlantica.— Dr. Christian Lütken, of the University of Copenhagen, has continued his most valuable discussion of the early stages of development of fishes, as shown by the rich "spoils of the Atlantic," young fishes taken in the open sea. The third paper of